REMARKS

A Substitute Specification is submitted herewith in accordance with 37 C.F.R. § 1.77(b).

Claim 1 is amended to incorporate the subject matter of claim 2, and claim 2 is canceled. In claims 1 and 3-18, "characterized in that" is amended to recite "wherein". In claims 3-16 and 18, "A process" is amended to recite "The process". In claims 3-5, 7, 8, 11, 13, 16 and 18, the phrases indicated as being indefinite are deleted. New dependent claims 19-25 are added to recite the subject matter deleted from claims 1, 3, 4, 7, 8, 13 and 18, respectively. Claim 5 is amended to further define the production strain. Support for the amendment can be found, for example, at page 7 of the present specification. In claim 11, "chip size" is amended to recite "chip length". Support for the amendment can be found, for example, at page 11 of the present specification. Claim 16 is amended to recite that "the mechanical pulp is subsequently made into paper".

No new matter is added. Upon entry of the Amendment, which is respectfully requested, claims 1 and 3-25 will be pending.

Response to Specification Objection

At page 3 of the Office Action, the Examiner states that the specification is objected to because it does not provide the headings as per 37 C.F.R. § 1.77(b).

A Substitute Specification is being submitted herewith.

Response to Claim Rejections under 35 U.S.C. § 112

Claims 2-5, 7, 8, 11, 13, 16 and 18

At page 3 of the Office Action, claims 2-5, 7, 8, 11, 13, 16 and 18 are rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite.

Claim 2 is canceled, and in claims 3-5, 7, 8, 11, 13, 16 and 18, the phrases indicated as being indefinite are deleted. Accordingly, Applicants respectfully request withdrawal of the § 112, second paragraph, rejection of claims 3-5, 7, 8, 11, 13, 16 and 18.

Claim 5

At page 5 of the Office Action, claim 5 is rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite.

Claim 5 is amended to recite that the production strain is selected from the group consisting of bacteria, fungi and molds. Accordingly, withdrawal of the § 112, second paragraph, rejection is respectfully requested.

Claim 11

At page 5 of the Office Action, claim 11 is rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite because it does not state whether the size is the length, width or thickness.

In claim 11, "chip size" is amended to recite "chip length" as suggested by the Examiner. Accordingly, withdrawal of the § 112, second paragraph, rejection is respectfully requested.

Claim 16

At page 5 of the Office Action, claim 16 is rejected under 35 U.S.C. § 112, second paragraph, and 35 U.S.C. § 101 because claim 16 recites a use with no steps.

Claim 16 is amended to recite that "the mechanical pulp is subsequently made into paper" as suggested by the Examiner. Accordingly, withdrawal of the § 112, second paragraph, and § 101 rejections is respectfully requested.

Response to Rejections under 35 U.S.C. § 102/103

At page 6 of the Office Action, claims 1, 5, 6, 8, 9, 10, 12, 13, 14, 15 and 16 are rejected under 35 U.S.C. § 102(b) as allegedly anticipated by or, in the alternative, under 35 U.S.C. 103(a) as allegedly obvious over WO 97/40194 (Eachus).

Applicants traverse and respectfully request the Examiner to reconsider in view of the following remarks.

The presently claimed invention relates to a process for preparing mechanical pulp, comprising (a) chipping the raw wood material, (b) pre-treating the chips with an enzyme that is capable of disintegrating the structural parts of the wood, (c) preparing mechanical pulp from the chips by refining. The enzymatic treatment is carried out by compressing the chips and bringing the compressed chips in a liquid phase into contact with an enzyme preparation containing cellobiohydrolase and endoglucanase in a weight ratio of the proteins of 20:1 - 1:20.

Eachus discloses a method for altering the structure or composition of wood which comprises adding to compressed wood a medium comprising a structure-altering or composition-altering effective amount of at least one biological agent. Eachus discloses that the biological agent preferably comprises one or more fungi or bacteria, one or more culture products thereof, such as enzymes, one or more substances obtained therefrom, one or more enzymes from non-microbial sources, one or more chemically modified enzymes, or combinations thereof. The fungi or bacteria utilized in the process of the invention may comprise lipid-degrading, protein-degrading, lignin-degrading, cellulose-degrading, or hemicellulose-degrading, bacteria or combinations thereof, either as combinations of species or strains of fungi or bacteria or as individual fungal or bacterial species or strains with multiple functionalities. Suitable fungi may

be selected from the group consisting of the genera *Ceriporiophsis, Phanerochaete* and *Ophiostoma*...(page 3).

In general, a reference is anticipatory when it "disclose[s] each and every element of the claimed invention", and it must "enable one of ordinary skill in the art to make the invention without undue experimentation". *In re Gleave*, 560 F.3d 1331, 1334 (Fed. Cir. 2009) (internal citations omitted). When the compound is not specifically named, but instead it is necessary to select portions of teachings within a reference and combine them, anticipation can only be found if the classes of substituents are sufficiently limited or well delineated. See, also, MPEP 2131.02.

In this case, Eachus discloses a vast number of unrelated biological agents. A person having ordinary skill in the art would have to pick and choose amongst the various exemplary biological agents of Eachus to arrive at *Phanerochaete*. In addition, although Eachus discloses cellulase, it does not expressly disclose cellobiohydrolase or endoglucanase. Further, Eachus does not specifically teach the use of the enzymes, especially cellulase, obtained from *Phanerochaete*. In fact, none of the Examples use *Phanerochaete* or the enzymes, such as cellulase, obtained therefrom.

Eachus does not disclose each and every element of the presently claimed invention, and a person having ordinary skill in the art would not have been able to at once envisage the claimed enzyme preparation from the broad disclosure of Eachus. Therefore, Eachus does not anticipate the present invention.

Further, not only is there is no teaching or suggestion of the claimed enzymatic preparation/treatment, but also Eachus teaches away from the present invention. In particular, Eachus teaches that "when enzymes are used, there may be no measurable removal or

decomposition of lignin, cellulose or hemicellulose, or combination thereof; rather, only a small portion of the covalent bonds of these wood constituents may be hydrolyzed." (page 4).

Moreover, the present invention discloses an enzyme preparation and treatment that is superior to the enzyme preparation and treatment of Eachus as evidenced by the unexpectedly superior results of the present invention as compared to Eachus.

Eachus discloses changing the structure or the composition of the wood by adding to the compressed chips fungal or bacterial cultures or products, such as enzymes obtained from them, by means of pressure. In Eachus, the purpose of the compression is to make cracks and fractures in the wood, and when the chips are released from the compression, microbes of their products, while the chips expand, are absorbed by the structures of the wood, partially by decompression, partially by capillary action. According to Eachus, the highest energy savings were made by combining enzyme preparations originating in different sources, of which the amount of lipase of a mammalian origin, in particular, is considerable. However, the amount of the other enzymes used is also fairly high which makes the energy savings achieved not particularly cost-effective.

In this regard, the Examiner's attention is kindly directed to the Examples of Eachus. In Example 3 at page 12 and 13 and in Example 4 at pages 14 and 15, wood chips were treated with buffer or with buffer and enzyme Clariant Cartazyme NS™ (Example 3) or with Clariant Cartazyme NS™ and Sigma porcine pancreas Lipase L (example 4) with and without compression of the chips. The chips were compressed in a ratio 4:1. The destructed compressed chips were allowed to expand into a solution comprising 50,000 units of Clariant Cartazyme NS™ –enzyme (xylanase) or with 50,000 units of Clariant Cartazyme NS™ and 350,000 Sigma porcine pancreas Lipase L-enzyme. In Example 3, xylanase was used alone, and in Example 4, xylanase was used together with lipase.

According to the examples of Eachus, the required power was reduced and pulp strength was improved. However, the amount of enzyme was 1,000 times the amount used as compared to the present invention. In Example 4, where lipase was used together with xylanase, the required power was reduced, but the use of lipase from animal source is not industrially useful.

In contrast, the present invention discloses an enzyme preparation containing an effective amount of both cellobiohydrolase and endoglucanase, produced in a host organism, which is applied directly to the chips. The present invention requires both cellobiohydrolase and endoglucanase enzymes because the endoglucanase is capable of preparing, in the chips, objects that the cellobiohydrolase is able to act on. The cellobiohydrolases and the endoglucanases work in synergy.

Consequentially, the present invention provides considerable advantages. The present invention can be used to considerably reduce the specific energy consumption of refining; as much as 20% lower energy consumption can be achieved than with untreated source materials. The present invention can also be used to improve the properties of the mass: a high yield is obtained in the manufacture of mechanical pulp by refining, the quality of the pulp is good, the strengths are maintained, and the optical properties are good. Further, the present invention can be applied to all manufacturing methods of mechanical pulp, such as the manufacture of thermo-mechanical pulp (TMP) and refined mechanical pulp (RMP).

Eachus does not anticipate or render obvious the present invention. Accordingly, withdrawal of the § 102 or, in the alternative, § 103 rejection of claims 1, 5, 6, 8, 9, 10, 12, 13, 14, 15 and 16 based on Eachus is respectfully requested.

Response to Rejections under 35 U.S.C. § 103

Claim 7

At page 8 of the Office Action, claim 7 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Eachus.

Claim 7 depends from claim 1, and thus, is patentable by virtue of its dependency from claim 1 which is patentable for the reasons discussed above.

Accordingly, withdrawal of the §103 rejection of claim 7 is respectfully requested.

Claim 11

At page 9 of the Office Action, claim 11 is rejected under 35 U.SC. § 103(a) as being unpatentable over Eachus in view of *Process Variables and Optimization* by Leask (Leask).

Claim 11 depends from claim 1, and thus, is patentable by virtue of its dependency from claim 1 which is patentable for the reasons discussed above. Leask does not make up for the deficiencies of Eachus.

Accordingly, withdrawal of the §103 rejection of claim 11 is respectfully requested.

Claims 1-10 and 12-18

At page 9 of the Office Action, claims 1-10 and 12-18 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Eachus in view of *Biodegradation and Biological Treatments of Cellulose, Hemicellulose and Lignin: An Overview* by Perez (Perez) and *Biotechnology in Degradation Andutilization of Lignocellulose* by Broda (Broda).

Applicants traverse and respectfully request the Examiner to reconsider in view of the following remarks.

The presently claimed invention is patentable over Eachus for at least the reasons discussed above, and neither Perez nor Broda make up for the deficiencies of Eachus, even if the references were to be combined.

Additionally, a person having ordinary skill in the art would not have been motivated to combine the cited references as the Examiner suggests.

The Examiner relies on Eachus as disclosing the presently claimed invention except the percentage of cellobiohydrolase and endoglucanase in the culture product of *Phanerochaete.* The Examiner states that Perez discloses that both *Phanerochaete* and *Trichoderma reesei* are white rot fungi. The Examiner states that it would have been obvious to substitute one white rot fungus for another white rot fungus, and a person having ordinary skill in the art would be motivated to do so because *Trichoderma reesei* is one of the most studied white rot fungi.

However, by stating, "Several thermophilic fungi can degrade cellulose faster than *T. reesei*" (page 56, col. 2), Perez teaches away from the use of *T. reesei*, and thus, a person having ordinary skill in the art would not be motivated to modify Eachus in view of Perez.

Accordingly, withdrawal of the §103 rejection of claims 1-10 and 12-18 is respectfully requested.

Claim 11

At page 12 of the Office Action, claim 11 is rejected under 35 § U.S.C. 103(a) as being unpatentable over Eachus, Perez and Broda, as applied to claim l above, and in view of Leask.

Claim 11 depends from claim 1. Claim 1 is patentable over Eachus, Perez and Broda for at least the reasons mentioned above, and Leask does not make up for the deficiencies of Eachus, Perez and Broda. Therefore, one having ordinary skill in the art would not arrive at the claimed invention, even if the references were to be combined.

Accordingly, withdrawal of the § 103 rejection of claim 11 is respectfully requested.

New Claims 19-25

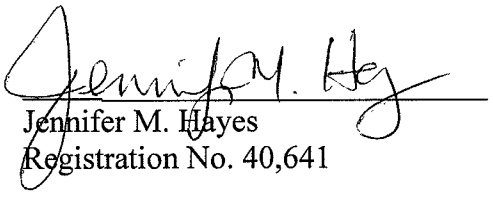
Applicants direct the Examiner's attention to new claims 19-25. Claims 19-25 depend from claims 1, 3, 4, 7, 8, 13 and 18, respectively, and recite the subject matter deleted from claims 1, 3, 4, 7, 8, 13 and 18. Claims 19-25 are patentable for at least the reasons that claim 1 is patentable which is patentable for the reasons mentioned above.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



Jennifer M. Hayes
Registration No. 40,641

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Date: April 5, 2010